

SON-1159/REISSUE

REISSUE APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Reissue Application for)
U.S. Patent No. 6,016,028 issued January 18, 2000)
Inventors: YUKINOBU IGUCHI ET AL.)
Reissue No. (Unassigned)) Attn: Applications Branch
Title: GLASS BULB FOR COLOR PICTURE)
TUBE AND THE SAME TUBE)

INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner of Patents
Box REISSUE
Washington, D.C. 20231

Sir:

The Applicants, through their representatives and attorneys, hereby bring to the attention of the Examiner the documents noted on the accompanying Form PTO-1449. Copies of the cited documents are provided for the Examiner's consideration.

These documents were noted during an opposition proceeding in the Japanese Patent Office for the Applicants' corresponding Japanese Patent No. 2,993,437 (which issued based on Applicants' Japanese priority Application No. P08-241364). Copies of the translations of two Notices of Patent Opposition dated June 19, 2000, a Notice of Reasons for Cancellation dated November 21, 2000, and an Official Decision on Opposition to Grant of Patent dated May 18, 2001, are enclosed. These translated documents, together with the partial translations attached to the cited references, satisfy the requirement for a concise explanation of relevance.

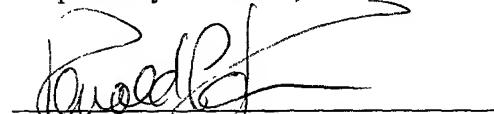
Docket No. SON-1159/REISSUE
Serial No. (Unassigned)

REISSUE APPLICATION

It is respectfully requested that the documents and other information cited herein be considered in the initial examination of this reissue application, and that their consideration be made of record.

Date: January 18, 2002

Respectfully submitted,



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INFORMATION DISCLOSURE CITATION <i>(Use several sheets if necessary)</i>		Atty. Docket No. SON-1159/REISSUE		Serial No. (Unassigned)	
		Applicant(s): Yukinobu Iguchi et al.			
		Filing Date:(Herewith)		Group: (Unassigned)	

U.S. PATENT DOCUMENTS

*Examiner Initial		Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate

FOREIGN PATENT DOCUMENTS

		Document Number	Date	Country	Class	Subclass	Translation	
							Yes	No
		Hei 2-148544	6/1990	Japan			X	
		Hei 7-99030	4/1995	Japan			X	
		Hei 7-142012	6/1995	Japan			X	
		Sho 51-118956	10/1976	Japan			X	
		Sho 62-213044	9/1987	Japan			X	
		Sho 52-43359	4/1977	Japan			X	
		Sho 61-158651	7/1986	Japan			X	
		Sho 64-77841	3/1989	Japan			X	
		Sho 50-106561	8/1975	Japan				X
		Hei 6-36710	2/1994	Japan			X	
		Sho 53-83572	7/1978	Japan			X	

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Page, Etc.)

		RCA Picture Tubes, 1980 RCA Corporation, pp. 45-49, "Contoured-line Screens for New In-Line Color Picture Tubes."
		Notice of Patent Opposition dated 6/19/00, by Taiko Tohyama, filed in Japanese Patent Office against corresponding Japanese Patent No. 2,993,437.
		Notice of Patent Opposition dated 6/19/00, by Teruo Itoh, filed in Japanese Patent Office against corresponding Japanese Patent No. 2,993,437.
		Notice of Reasons for Cancellation dated 11/21/00, by Trial Examiner of Japanese Patent Office, for corresponding Japanese Patent No. 2,993,437.
		Official Decision on Opposition to Grant of Patent dated 5/18/01, by Japanese Patent Office, for corresponding Japanese Patent No. 2,993,437.

EXAMINER	DATE CONSIDERED

*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

(12,700 yen)

Notice of the Patent Opposition

June 19, 2000

To: General Director, Esq.
the Patent Office

1. Designation of Patent on the Notice of the

Patent Opposition

Patent No. Patent No.2,993,437

Designation of the claims All the claims

2. Patent Opponent

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Name : Taiko Tohyama

(1) Summary of Reasons for Notice

Claims 1, 2:

Item No.2 of Article 29 of the Patent Law (No.2, Item No.1 of Article 113 of the Patent Law)

Claim	Present Patented Invention	Evidence
1	<p>A. ① a glass bulb in which the external surface of the effective display area of the face plate is substantially flat and the internal surface of the effective display area of the face plate has the concave curvature toward the following color selection mask, and</p> <p>B. ② a color selection mask having the curvature projected toward the face plate provided opposed to the internal surface of the face plate within said glass bulb, in which said projected curvature is bigger than that of said internal surface of the face plate.</p> <p>C. ③ A cathode ray tube comprising (Effect) It is possible to make a thin face plate while assuring a required mechanical strength by setting the inner surface of the face plate to a concave curved surface at its side facing against the color selection mask.</p>	<p><u>Evidence A No.1</u> (Gazette of Patent Laid-Open No.Hei 7-142012) A + C A technical gist to disclose a color cathode ray tube having a face part 7 in which the outer surface is made flat, a radius of curvature of the inner surface is reduced and its peripheral part is made thick. (Effect) A visual acknowledgement can be improved by making the inner surface of the face part flat and both a mechanical strength and a light weight formation can be attained by making a thickness of the peripheral part thick. (paragraphs [0007] to [0009], [0036] and Fig.3)</p> <p><u>Evidence A No.2</u> (Gazette of Patent Laid-Open No.Hei 2-148544) A + C A technical gist to disclose a color cathode ray tube having a face plate in which the outer surface is made substantially flat and its side facing against the shadow mask is made as a concave surface. (Claim 1, Fig.1)</p> <p><u>Evidence A No.3</u> (Gazette of Patent Laid-Open No. Sho 51-118956) A' + B + C A technical gist to disclose a color cathode ray tube having a face plate 76 with its inner and outer surfaces being substantially flat and having a curved surface shadow mask 74 with its side facing against the face plate 76 being convex. (Lines 1 to 2, right lower column in page 1, lines 4 to 10, left lower column in page 5, Fig.10)</p> <p><u>Evidence A No.4</u> (Gazette of Patent Laid-Open No.Sho 62-213044) B + C</p>

A technical gist to disclose a color cathode ray tube having a curved surface like shadow mask (6) with the fluorescent screen (3) being convex and in which a radius of curvature is smaller than a radius of curvature of the inner surface of the panel (2).
(Lines 4 to 7, left upper column in page 3, lines 13 to 18, left upper column in page 3, Fig.1)

Evidence A No.5 (Gazette of Patent Laid-Open No.Sho 52-43359)

A technical gist to describe the fact that a space among three projecting points of three electron beams R, G and B can be prevented from being narrowed on the fluorescent screen at the peripheral part in a horizontal direction by widening a distance between the shadow mask and the inner surface of the face plate at both ends in a horizontal direction than that at both ends in a vertical axis direction and occurrence of color shift can be restricted.

(Claims, line 7 from the last line in left lower column in page 1 to line 4, left lower column in page 2, lines 8 to 17, left upper column in page 3, Fig.1, Fig.2, Fig.3 and Fig.5)

Evidence A No.6 (Gazette of Patent Laid-Open No.Sho 61-158651)

A technical gist to describe the fact that an arrangement space of triple color fluorescent members in a horizontal direction is made larger at a screen orthogonal part than at a screen central part by increasing a space between panel (5) and a shadow mask (22) at the peripheral part in a vertical direction and at an orthogonal part and then occurrence of miss-landing caused by reduction in margin of purity at the screen orthogonal part can be prevented.

(Claim 1, lines 9 to 11, left lower column in page 2, line 5 from the last line, right upper column to line 4, left lower column in page 3, Figs.1(A), (B))

	D. A cathode ray tube according to claim 1, said color selection mask has a plurality of slits, in which the space between adjacent slits are gradually widened toward the peripheral area in the horizontal direction of the face plate.	<u>Evidence A No.3</u> (Gazette of Patent Laid-Open No.Sho 51-118956) D A technical gist to disclose a shadow mask 74 where there are formed many mask holes through which electron beams pass and a space "a" of the mask holes is increased as it approaches the peripheral part
2	(Effect) A color purity at the peripheral part can be substantially improved.	(Effect) Increasing the space "a" at the peripheral part causes a positional displacement tolerance of the fluorescent beam at the peripheral part to be increased. In addition, increasing both a curvature of the mask and the space "a" enables a positional displacement at the position where influence of the doming substantially appears to be decreased. (Claim: the last line, right lower column in page 3 to line 2, left upper column in page 4; lines 5 to 6, left upper column in page 4; the last line, right lower column in page 4 to line 2, left upper column in page 5; lines 12 to 9 from the last line, right upper column in page 5; lines 4 to 10, left lower column in page 5; and lines 4 to 7, right lower column in page 5)

Gist of the reasons

[Claim 1]

Evidence A No.1 and Evidence A No.2 have description about A and C, Evidence A No.3 has a description about a part of A, B and C, and Evidence A No.4 has a description about B and C. Accordingly, the invention related to Claim 1 could easily be invented in reference to Evidence A No.1 to Evidence A No.4. In addition, Evidence A No.1 has a description about the same action and effect as the effect attained by A of Claim 1. In addition, the effect that either a grouping or a de-grouping is hardly produced by the color selection mask having a convex curvature larger than a curvature of inner part of the face plate described in "Description of Circumstances on Accelerated Examination" can be estimated on the basis of Evidence A No.5 and Evidence A No.6. Thus, the invention related to Claim 1 could easily be invented under a combination of Evidence A No.5 and Evidence A No.6 with the aforesaid Evidence A No.1 to Evidence A No.4.

[Claim 2]

D of Claim 2 and its effect are already described in Evidence A No.3 and Evidence A No.7. Accordingly, the invention related to Claim 2 could easily be invented on the basis of the inventions described in Evidence A No.1 to Evidence A No.4 and Evidence A No.7. Further, the invention related to the present Claim 2 could easily be invented on the basis of the inventions described in Evidence A No.1 to Evidence A No.7.

- Claims 3, 4

No.3, Item No.1 of Article 29 of the Patent Law (No.2, Item No.1, Article 113 of the Patent Law
Item No.2 of Article 29 of the Patent Law (No.2, Item No.1 of Article 113 of the Patent Law)

Claim	Present Patented Invention	Evidence
3	<p>E. ① a glass bulb in which the external surface of the effective display area of the face plate is substantially flat and the thickness of the effective display area of the face plate is substantially uniform, and</p> <p>F. ② a color selection mask having the curvature projected toward the face plate provided opposed to the internal surface of the face plate within said glass bulb.</p> <p>G. A cathode ray tube comprising</p>	<p><u>Evidence A No.3</u> (Gazette of Patent Laid-Open No.Sho 51-118956) E + F + G A technical gist to disclose a color cathode ray tube having a face plate 76 acknowledged to have its inner and outer surfaces substantially flat and its thickness substantially uniform, and a curved-surface like shadow mask 74 with its side facing against the face plate 76 being applied as a (Lines 1 to 2, right lower column in page 1; lines 4 to 10, left lower column in page 5, Fig.10)</p> <p><u>Evidence A No.8</u> (Gazette of Patent Laid-Open No.Sho 50-106561) E + F + G A technical gist to disclose a color cathode ray tube having a face plate (1) acknowledged to have its inner and outer surfaces substantially flat and its thickness substantially uniform, and a shadow mask (2) with its side facing against the face plate (1) being applied as a convex surface. (Lines 7 to 11, right lower column in page 1, Fig.2)</p> <p><u>Evidence A No.5</u> (Gazette of Patent Laid-Open No.Sho 52-43359) A technical gist to describe the fact that a space among three projecting points of three electron beams R, G and B can be prevented from being narrowed on the fluorescent screen at the peripheral part in a horizontal direction by widening a distance between the shadow mask and the inner direction than that at both ends in a vertical axis direction and occurrence of color shift can be restricted.</p>

(Claims, line 7 from the last line in left lower column in page 1 to line 4, left lower column in page 2, lines 8 to 17, left upper column in page 3, Fig.1, Fig.2, Fig.3 and Fig.5)

Evidence A No.6 (Gazette of Patent Laid-Open No.Sho 61-158651)

A technical gist to describe the fact that an arrangement space of triple color fluorescent members in a horizontal direction is made larger at a screen orthogonal part than at a screen central part by increasing a space between panel (5) and a shadow mask (22) at the peripheral part in a vertical direction and at an orthogonal part and then occurrence of miss-landing caused by reduction in margin of purity at the screen orthogonal part can be prevented.

(Claim 1, lines 9 to 11, left lower column in page 2, line 5 from the last line, right upper column to line 4, left lower column in page 3, Figs.1(A), (B))

Evidence A No.3 (Gazette of Patent Laid-Open No.Sho 51-118956) H

A technical gist to disclose a shadow mask 74 having many mask holes where electron beams pass and a space "a" of the mask holes is increased as it approaches the peripheral part.

(Effect)

Increasing the space "a" at the peripheral part causes a positional displacement tolerance of the fluorescent beam at the peripheral part to be increased. In addition, increasing the curvature of the mask and the space "a" of it enables a positional displacement to be decreased at the position where influence of doming substantially appears.

(Claim; the last line, right lower column in page 3 to line 2, left upper column in page 4; lines 5 to 6, left upper column in page 4; the last line, right lower column in page 4 to line 2, left upper column in page 5; lines 12 to 9 from the last line, right upper column in page 5; lines 4 to 10, left lower column in page 5; lines 4 to 7 right lower column in page 5)

Evidence A No.7 (Gazette of Patent Laid-Open No.Sho 64-77841) H

A technical gist to disclose the fact that a lateral pitch around the screen is made to be larger than a lateral pitch at the central part of the screen of the shadow mask to enable a purity margin to be increased.
(Line 4 from the last line, left lower column to line 2, right lower column in page 1)

Gist of the reasons

[Claim 3]

All composing elements E, F and G of Claim 3 are already described in Evidence A No.3. Accordingly, the invention related to Claim 3 is the same as the invention described in Evidence A No.3. In addition, if they are not the same to each other, the invention related to Claim 3 could easily be invented in reference to the invention described in Evidence A No.3. All composing elements E, F and G of Claim 3 are also described in Evidence A No.8. Accordingly, the invention related to Claim 3 is the same as the invention described in Evidence A No.8. In addition, even if they are not the same to each other, the invention related to Claim 3 could easily be invented in reference to the invention described in Evidence A No.8. In addition, the effect that either a grouping or a de-grouping is hardly produced by the color selection mask having a convex curvature larger than a curvature of Thus, the invention related to Claim 3 could easily be invented under a combination of Evidence A No.5 and Evidence A No.6 with the aforesaid Evidence A No.3 to Evidence A No.8.

[Claim 4]

H of Claim 4 and its effect are already described in Evidence A No.3 and Evidence A No.7. Accordingly, the invention related to Claim 4 is the same as the invention described in Evidence A No.3. In addition, even if they are not the same to each other, the invention related to Claim 4 could easily be invented by those skilled in the art in reference to the invention described in Evidence A No.3. Further, the invention related to Claim 4 could easily be invented by those skilled in the art in reference to the inventions described in Evidence A No.3 and Evidence A Nos.5 to 8

(2) Background of the Procedure

Filing Date: August 23, 1996
(Patent Application No.Hei 8-241364)

Request for Examination: July 1, 1999

Date of Procedural Amendment: July 1, 1999

Date of Procedural Amendment: July 26, 1999

Description of Circumstances for Accelerated Examination:

July 26, 1999

Decision of Patent (Date of draft): September 14, 1999

Date of Registration: October 22, 1999

Date of Issue of Gazette: December 20, 2000

(Patent No.2,993,437)

(3) Proof for the Notice

Claim 1

a) Article: Item No.2, Article 29 of the Patent Law (No.2, Item No.1 of Article 113 of the Patent Law)

Proof: Evidence A No.1 to Evidence A No.4

b) Article: Item No.2, Article 29 of the Patent Law (No.2, Item No.1 of Article 113 of the Patent Law)

Proof: Evidence A No.1 to Evidence A No.6

Claim 2

a) Article: Item No.2, Article 29 of the Patent Law (No.2, Item No.1 of Article 113 of the Patent Law)

Proof: Evidence A No.1 to Evidence A No.4 and Evidence A No.7

b) Article: Item No.2, Article 29 of the Patent Law (No.2, Item No.1 of Article 113 of the Patent Law)

Proof: Evidence A No.1 to Evidence A No.7

Claim 3

a) Article: No.3, Item No.1, Article 29 of the Patent Law (No.2, Item No.1 of Article 113 of the Patent Law)

Proof: Evidence A No.3

b) Article: Item No.2, Article 29 of the Patent Law (No.2, Item No.1 of Article 113 of the Patent Law)

Proof: Evidence A No.3

c) Article: No.3, Item No.1, Article 29 of the Patent Law (No.2, Item No.1 of Article 113 of the Patent Law)

Proof: Evidence A No.8

d) Article: Item No.2, Article 29 of the Patent Law (No.2, Item No.1 of Article 113 of the Patent Law)

Proof: Evidence A No.8

e) Article: Item No.2, Article 29 of the Patent Law (No.2, Item No.1 of Article 113 of the Patent Law)

Proof: Evidence A No.3, Evidence A No.5, Evidence A No.6, Evidence A No.8

Claim 4

a) Article: No.3, Item No.1, Article 29 of the Patent Law (No.2, Item No.1 of Article 113 of the Patent Law)

Proof: Evidence A No.3

b) Article: Item No.2, Article 29 of the Patent Law (No.2, Item No.1 of Article 113 of the Patent Law)

Proof: Evidence A No.3

c) Article: Item No.2, Article 29 of the Patent Law (No.2, Item No.1 of Article 113 of the Patent Law)

Proof: Evidence A No.3, Evidence A Nos.5 to 8

(4) Practical Reasons

① Present Patented Invention

It is assumed that each of the patented inventions related to Claims 1 to 4 of the present case consists in each of the descriptions in the Claims in reference to the specification and the drawings found at the time of official decision to grant a patent.

[Claim 1]

C. A cathode ray tube comprising

A.① a glass bulb in which the external surface of the effective display area of the face plate is substantially flat and the internal surface of the effective display area of the face plate has the concave curvature toward the following color selection mask, and

B.② a color selection mask having the curvature projected toward the face plate provided opposed to the internal surface of the face plate within said glass bulb, in which said projected curvature is bigger than that of said internal surface of the face plate.

[Claim2]

D. A cathode ray tube according to claim 1,
said color selection mask has a plurality of slits, in which the space between
adjacent slits are gradually widened toward the peripheral area in the horizontal
direction of the face plate.

[Claim3]

G. A cathode ray tube comprising
E. ①a glass bulb in which the external surface of the effective display area of the face
plate is substantially flat and the thickness of the effective display area of the face
plate is substantially uniform, and
F. ②a color selection mask having the curvature projected toward the face plate
provided opposed to the internal surface of the face plate within said glass bulb.

[Claim4]

H. A cathode ray tube according to claim 3,
said color selection mask has a plurality of slits, in which the space between
adjacent slits are gradually widened toward the peripheral area in the horizontal
direction of the face plate.

Then, each of the patented inventions has some effects with this constitution
(Paragraphs [0025] to [0026]).

With introduction of the glass bulb for color picture tube of the present invention, not
only a color picture tube having the flat surface can be realized, but also higher
mechanical shock resistance characteristic of the glass panel for external shock can be
realized and it is no longer required to make thicker the face plate in order to assure the
sufficient strength for explosion. In comparison with the flat type face plate, weight of
the face plate can be reduced by about 10% to 20 %. Moreover, while keeping the
manufacturing system and quality of the related art, the color picture tube having the
flat display surface can be realized by introduction of the color picture tube of the
present invention. In addition, since the color selection mask having the curvature
projected toward the face plate is provided, not only vibration of color selection mask
due to external vibration can be prevented but also generation of color displacement due
to the doming effect can also prevented effectively,

② Description of the proof

a) Evidence A No.1 (Gazette of Patent Laid-Open No.Hei 7-142012)

In Fig.3 of Evidence A No.1 is illustrated a cathode ray tube comprised of a face part

7 and a shadow mask 14. Then, as the glass bulb for the prior art cathode ray tube, it is described "There is employed a constitution in which the outer surface of the face part is made flat, a radius of curvature of the inner surface is reduced and the four corners, in particular, the peripheral segments of the face part are made thick." (a paragraph [0009]). Then, a visual acknowledgement can be improved by making the outer surface of the face part flat and the mechanical strength and its light weight formation can be balanced (paragraphs [0007] to [0009]). Further, it is also indicated that the cathode ray tube described there can be used as one for a color television. (a paragraph [0036])

b) Evidence A No.2 (Gazette of Patent Laid-Open No.Hei 2-148544)

Evidence A No.2 has a description about "a color cathode ray tube of a shadow mask system characterized in that there is provided a face plate forming either a substantial spherical surface or a cylindrical surface with a radius of curvature at the inner surface being limited and with the outer surface forming a substantial flat surface." (Claim 1). In addition, in Fig.1 is illustrated the cathode ray tube having a face plate 11 in which its outer surface is substantially flat surface and its inner surface is a concave curved surface at its side facing against the shadow mask 6.

c) Evidence A No.3 (Gazette of Patent Laid-Open No.Sho 51-118956)

Evidence A No.3 relates to a color cathode ray tube (lines 1 to 2, right lower column in page 1) and has a description in its claim saying "a cathode ray tube characterized in that a central space between the adjoining two holes of said mask is not uniform and a space between said mask and the screen is changed in proportion to a variation of the central space of said adjoining holes", and further has a description saying "In the 10th figure, cathode ray tube 72 is shown with curved surface shadow mask 74 and flat shape face plate 76. In this cathode ray tube, the interval "q" virtually increases as it goes from center to periphery of the shadow mask, and also the interval "a" of the mask slit similarly increases in order to maintain the sufficient phosphor line pattern on the screen". (lines 4 to 10, left lower column in page 5). In this case, "q" is meant by a space between the shadow mask and the screen, "a" is meant by a center-to-center space of two holes in the mask, respectively (the last line, right lower column in page 3 to line 2, left upper column in page 4; lines 5 to 6, left upper column in page 4). Then, in Fig.10 is illustrated a color cathode ray tube 72 having a face plate 76 acknowledged that its inner and outer surfaces are substantially flat and their thickness is substantially uniform, and having a curved-surface shadow mask 74 with its side facing against the face plate 76 being convex. Further, it is described that "a basic concept of the constitution of the present invention consists in a combination between an increasing of a curvature of the shadow mask and a changing of the space "a" as it advances from the

central part of the tube toward the outside" (lines 4 to 7, left lower column in page 5)

In addition, it is described that "it becomes possible to increase a positional displacement tolerance of the fluorescent beam placed at a position displaced from the center due to increased space "a"" (the last line, right lower column in page 4 to line 2, left upper column in page 5). There is also provided a description saying "The position difference in the position where the influence of doming appears most drastically on the screen decreases remarkably by increasing the curvature and the interval "a" of the shadow mask"(lines 9 to 12, right upper column in page 5).

d) Evidence A No.4 (Gazette of Patent Laid-Open No.Sho 62-213044)

In Fig.1 is illustrated a substantial sectional view for showing a color cathode ray tube. In this case, the shadow mask (6) is made such that its side facing against the fluorescent screen (3) has a shape indicated by a convex folded line (6a) (lines 4 to 7, left upper column in page 3). In addition, the shadow mask (6) has a specified space against a curved surface of the fluorescent screen (3) at the inner surface of the panel (2) and in the case where it has a rotational symmetrical shape with its center being placed at Z-axis of the tube axis, for example, a spherical surface, it is formed to have a radius of curvature smaller than the radius of curvature by a predetermined length (lines 13 to 18, left upper column in page 3).

e) Evidence A No.5 (Gazette of Patent Laid-Open No.Sho 52-43359)

As shown in Figs.1 and 2, there is provided color cathode ray tube having in-line type electron guns arranged within a horizontal plane where three electron beams of R, G and B are directed in a horizontal direction, and the inner surface of the face plate 3 supporting the fluorescent screen 2 and a major plane of the shadow mask 1 form substantially a similar spherical surface, wherein it is pointed out that when each of the arrangement pitches in a horizontal direction in a group of apertures formed at the major plane of the shadow mask 1 is set to be uniform, dot trios formed by three electron beams R, G and B passed through the apertures and struck against the fluorescent screen 2 were approached to each other around a central horizontal axis X-X, in particular, as shown in Fig.3 (line 7 from the last line, left lower column to line 4, left lower column in page 2).

Evidence A No.5 provides a proposal that an inter-space between the shadow mask and the inner surface of the face plate is made large at the central horizontal axis as compared with one on the central vertical axis to eliminate this problem (Claim)

As a practical example, in Fig.5 is illustrated a shadow mask in which a curved surface directed in Y'-Y" axis (a vertical axis direction) is formed against the inner spherical surface of the face plate by an arc off radius R2 and the curved surface of X"-X"

axis direction (a horizontal axis direction) is formed with an arc of radius R₁ (R₁ < R₂) (lines 8 to 17, left upper column in page 3). As a result, the inter-space distance between the shadow mask and the inner surface of the face plate shows a wider space at both ends of X"-X" axis direction (a horizontal axis direction) than that at both ends of Y"-Y" axis direction (a vertical axis direction).

f) Evidence A No.6 (Gazette of Patent Laid-Open No.Sho 61-158651)

Evidence A No.6 discloses the color Braun tube in which an arrangement space in a horizontal direction of triple-color fluorescent member at the screen orthogonal segments is wider than an arrangement space in a horizontal direction at a screen central part in order to eliminate the problem of the prior art Braun tube where a purity margin is less and a miss-landing is easily produced at the periphery of the screen, in particular at the orthogonal part (lines 9 to 11, left lower column in page 2)(Claim 1). As its practical constitution, in Fig.1(A) is illustrated an arrangement state for triple color fluorescent members (B), (G) and (R) on the inner surface of the panel at the screen central part, and in Fig.1(B) is illustrated an arrangement state for triple color fluorescent members (B), (G) and (R) on the inner surface of the panel at the screen orthogonal part, respectively. Then, such an arrangement of the fluorescent members can be attained by widening a space between the panel (5) and the shadow mask (22) at both peripheral part in the vertical direction and at the orthogonal segments, thereby the electron beams radiated from the electron guns can be correctly incident to the desired fluorescent members (B), (G) and (R)(line 5 from the last line, right upper column in page 3 to line 4 in left lower column).

g) Evidence A No.7 (Gazette of Patent Laid-Open No.Sho 64-77841)

Evidence A No.7 discloses that a curvature of the shadow mask at its peripheral part can be increased and a purity margin can be increased by increasing a lateral pitch at the periphery of the screen more than a lateral pitch at the screen central part of the shadow mask (line 4 from the last line, left lower column to line 2, right lower column in page 1). The "lateral pitch" defined herein is substantially the same meaning as an allowable range of miss-landing of electron beams where purity is not damaged.

That is, Evidence A No.7 discloses that miss-landing of electron beams can be prevented and reduction in purity can be prevented by a method wherein the lateral pitch around the screen of the opening part formed at the shadow mask is increased.

h) Evidence A No.8 (Gazette of Patent Laid-Open No.Sho 50-106561)

Evidence A No.8 discloses the color cathode ray tube where the major part of the shadow mask (2) opposing against the flat-plate like face plate (1) is formed in a convex shape (lines 7 to 11, right lower column in page 1, Fig.2). Then, in Fig.2 is illustrated a

color cathode ray tube having the face plate (1) acknowledged as the inner and outer surfaces being substantially flat surfaces and a thickness of each of them being substantially uniform and the shadow mask (2) with the side facing against the face plate (1) being convex.

- ③ Comparison between the present patented invention and the invention described in the proof

[Claim 1]

a) Comparing the invention related to Claim 1 of the present invention with the invention described in Evidence A No.1 shows that "the face part 7" in Evidence A No.1 corresponds to "the face plate" of Claim 1 of the present invention and "the shadow mask" in Evidence A No.1 corresponds to "the color selection mask" of Claim 1 of the present invention. Then, Evidence A No.1 discloses the color cathode ray tube having the face part 7 in which its outer surface is made flat, a radius of curvature of the inner surface is reduced and its peripheral part is made thick. Accordingly, Evidence A No.1 discloses A and C of the composing elements (hereinafter this is defined as "the invention specifying items") specifying the invention related to Claim 1 of the present invention.

In addition, Evidence A No.1 discloses that the outer surface of the face part is made flat to assure a visual acknowledgment and the curvature of the inner surface is made small to enable both a mechanical strength and a light weight to be attained, and these facts are the same as the actions and effects described in a paragraph [0008] of the specification of the patented invention.

b) Comparing the invention related to Claim 1 of the present invention with the invention described in Evidence A No.1 shows that "the face plate 11" in Evidence A No.2 corresponds to "the face plate" of Claim 1 of the present invention and "the shadow mask 6" in Evidence A No.2 corresponds to "the color selection mask" in Claim 1 of the present invention. Then, Evidence A No.2 discloses the color cathode ray tube having the face plate 11 with its outer surface being substantially flat surface and its side facing against the shadow mask being a concave surface. Accordingly, Evidence A No.2 discloses A and C of the composing elements specifying the invention related to Claim 1 of the present invention.

c) Comparing the invention related to Claim 1 of the present invention with the invention described in Evidence A No.3 shows that "the face plate 76" in Evidence A No.3 corresponds to "the face plate" of Claim 1 of the present invention and "the shadow mask 74" in Evidence A No.3 corresponds to "the color selection mask" in Claim 1 of the

present invention, respectively. Then, Evidence A No.3 discloses the color cathode ray tube having the curved-surface shadow mask 74 while being oppositely faced against the inner surface of the face plate 76. The face plate 74 is defined as "a flat surface" and in Fig.10 is illustrated the cathode ray tube 72 having the face plate 76 with its inner and outer faces being substantially flat, and the shadow mask 74 with its side facing against the face plate 76 being a convex surface. Accordingly, Evidence A No.3 discloses a part of A, B and C of the composing elements specifying the invention related to Claim 1 of the present invention.

d) Comparing the invention related to Claim 1 of the present invention with the invention described in Evidence A No.4 shows that "the panel (2)" in Evidence A No.4 corresponds to "the face plate" of Claim 1 of the present invention and "the shadow mask (6)" in Evidence A No.4 corresponds to "the color selection mask" in Claim 1 of the present invention, respectively. Then, Evidence A No.4 discloses the color cathode ray tube having the curved-surface shadow mask (6) with its side facing against the fluorescent screen (3) being convex and in which a radius of curvature of the shadow mask (6) is smaller than a radius of curvature at the inner surface of the panel (2). Accordingly, Evidence A No.4 discloses B and C of the composing elements specifying the invention related to Claim 1 of the present invention.

e) As described above, Evidence A Nos.1 and 2 have a description of A and C in the specifying composing elements A to C described in Claim 1 of the present invention, Evidence A No.3 has a description about a part of A, B and C, and Evidence A No.4 has a description about B and C. Then, all Evidence A Nos.1 to 4 relate to the color cathode ray tube (the specifying element C of the present invention). Accordingly, the invention related to Claim 1 comprised of invention specifying composing elements A to C can be easily attained under an appropriate combination of Evidence A Nos.1 to 4.

Further, Evidence A No.1 has a description of the same action and effect as those of the invention specifying composing element A of Claim 1 of the present invention.

In addition, a paragraph [0013] in the specification of the present patent has a description of " In addition, since the color selection mask having the curvature projected toward the face plate is provided, when the aperture grill is used, for example, as the color selection mask, it can effectively prevented that the color selection mask is vibrated due to external vibration, because of use of the dumping wire, as is done in the related art. Moreover, since the color selection mask can be attached to the frame member with a sufficient tension, it can also be prevented effectively that color displacement by the doming phenomenon is generated, in which color selection mask is expanded because electron beams collide with the color selection mask. In addition,

even in case the shadow mask is used as the color selection mask as well as the aperture grill, it is possible to introduce the structure similar to that of the related art because the shaping of the projected surface is possible". That is, as apparent from the description of "as in the prior art" or "in the same manner as that of the prior art", applying "the convex color selection mask having a curvature ... toward the face plate" in the invention specifying composing element B is well known in the art as acknowledged by the patentee himself without describing any example and its effect caused by this composing element is also well known. Accordingly, even if Evidence A Nos.3 and 4 have no description about effect attained under application of "the color selection mask having a convex curvature ... toward the face plate", such an effect as above is a mere degree of estimated one which could easily be estimated by those skilled in the art referring to Evidence A Nos.3 and 4.

The patentee might insist that the color selection mask in the invention specifying composing element B "has a convex curvature larger than a curvature of the inner surface of the face plate", thereby an effect (line 2 from the last line in page 6 to line 2 in page 7 of "Description of Circumstances on Accelerated Examination" submitted on July 26, 1999) saying "that is, the color cathode ray tube has a color selection mask in such a way that the distance between the face plate and the color selection mask becomes elongated as it approaches toward the periphery in a horizontal direction of the face plate, resulting in that either a grouping or a de-grouping is hardly produced" and that such an effect as above is not described at all in Evidence A Nos.3 and 4. However, the opponent insists in advance that such an insistence as above is not appropriate in view of the following two reasons.

At first, the aforesaid effect is not described at all in the specification and the drawings of the present patent. If the color selection mask shows a specific effect that those skilled in the art may not estimate due to the fact that "it has a larger convex curvature than a curvature of the inner surface of the face plate", such an effect as above must be clearly disclosed in either the specification or the drawings. In addition, if the invention related to Claim 1 of the present invention is one of the problems aiming at resolving prevention of either grouping or de-grouping. If such effects or problems as above are not described, those skilled in the art cannot clearly understand the technical meaning of the item that "it has a convex curvature larger than the curvature of the inner surface of the face plate", resulting in that the specification and the drawings of the present patent do not satisfy the requirements defined in Item No.4 of Article 36 of the Patent Law. To the contrary, if those skilled in the art can understand the technical meaning of the item "having a convex curvature larger than that of the curved surface

inside the face plate" even if there is no description about such an effect as above and the problems, such effect cannot be said as a specific one.

Secondly, in reference to the descriptions of Evidence A No.5 and Evidence A No.6, those skilled in the art could easily estimate the fact that the grouping or de-grouping is hardly generated and purity can be improved by applying the color selection mask with a convex curvature larger than a curvature of the inner surface of the face plate, thereby elongating a space between the face plate and the color selection mask.

That is, Evidence A No.5 has a description that it is possible to prevent a narrow space of striking points of three electron beams of R, G and B at the periphery in a horizontal axis direction on the fluorescent screen by widening a distance between the shadow mask (corresponding to "the color selection mask" specific to the present invention) and the inner surface of the face plate at both ends in a horizontal axis direction larger than at both ends in a vertical axis direction, and further it is possible to restrict occurrence of color shift.

In addition, Evidence A No.6 has a description that an occurrence of miss-landing caused by the reduction in purity margin at the screen orthogonal part by increasing a space between the panel (5) (corresponding to "face plate" of the present patent and the shadow mask (22) (corresponding to "the color selection mask" of the present patent) at the peripheral part in a vertical direction and at the orthogonal part to cause the arrangement space of the triple-color fluorescent members in a horizontal direction at the screen orthogonal part to be larger than that of the screen central part.

As apparent from the aforesaid Evidence A No.5 and Evidence A No.6, it is known in the art before filing the present patent that a space between the face plate and the color selection mask is made wide at the peripheral part to enable a space of striking points of electron beams onto the inner surface of the face plate to be widened and the color shift caused by the miss-landing can be prevented from being generated. Accordingly, the phenomenon that "either a grouping or a de-grouping is hardly produced under an arrangement of the color cathode ray tube having a color selection mask constructed to cause a distance between the face plate and the color selection mask to be elongated as it faces toward the periphery of the face plate in a horizontal direction" is well known by those skilled in the art before filing of the present patent application and so this is a well-used technology. Then, this technology aims at only the space between the inner surface of the face plate and the color selection mask, so that those skilled in the art can easily understand that this can be applied irrespective of whether or not the outer surface of the face plate is a flat surface or the inner surface is a curved surface or a flat surface. Thus, even if Evidence A No.3 and Evidence A No.4 disclosing the constitution

in which the space between the face plate and the color selection mask is made wide as it approaches the periphery in a horizontal direction have no clear description about the effect insisted by the present patentee in the aforesaid "Description of Circumstances on Accelerated Examination", those skilled in the art acknowledging Evidence A No.5 and Evidence A No.6 can easily estimate the aforesaid effect only through seeing the constitution actually disclosed there.

f) As described above, the invention related to Claim 1 of the present invention could easily be invented by those skilled in the art in reference to the inventions described in Evidence A No.1 to Evidence A No.4.

Further, the invention of Claim 1 of the present case could easily be invented under a combination of the inventions described in Evidence A No.1 to Evidence A No.4 with the inventions described in Evidence A No.5 and Evidence A No.6.

[Claim 2]

a) The specifying composing element D described in Claim 2 of the present invention is described in Evidence A No.3. That is, Evidence A No.3 discloses that the cathode ray tube 72 (Fig.10) has a constitution in which the space "q" between the shadow mask 74 and the face plate 76 is actually increased as it approaches from the center of the shadow mask 74 to its peripheral edge, many mask holes (corresponding to "the opening" of the present patent) through which electron beams may pass are formed at the cathode ray tube 74, the shadow mask 74 is made such that the space "a" of the mask holes is increased as it approaches in correspondence with variation of the space "q".

In addition, Evidence A No.3 discloses that a positional displacement tolerance of the fluorescent beam placed at a position displaced from the center can be increased by increasing the space "a" at the peripheral edge and that the positional displacement at a location where influence caused by doming on the screen appears most substantially by increasing both curvature of the mask and the space "a" and so this is substantially coincided with the description saying that "the space (pitch) between the opening 21 and the opening 21 is expanded as it approaches toward the peripheral edge of the face plate 10 in a horizontal direction, in particular, purity at the peripheral part of the television color cathode ray tube can be substantially improved" described in a paragraph [0016] in the specification of the present patent. Because, the positional displacement may induce a miss-landing of electron beams, resulting in that it may lead to the reduction in purity.

b) In addition, the specifying composing element D of the invention described in Claim 2 of the present case is also described in Evidence A No.7. That is, Evidence A No.7

discloses the color cathode ray tube having a large curvature around the shadow mask, wherein a lateral pitch around the periphery of the screen at the opening formed at the shadow mask is increased. In addition, it discloses that the miss-landing of the electron beams can be prevented and reduction of purity can also be prevented, and this disclosure may coincide with improvement of purity described in a paragraph [0016] of the specification of the present patent.

c) As to the item concerning Claim 1 cited in Claim 2 is similar to the description in Claim 1.

d) Accordingly, the invention related to Claim 2 of the present patent could easily be invented by those skilled in the art in reference to the inventions described in Evidence A No.1 to Evidence A No.4 and Evidence A No.7.

Further, the invention related to Claim 2 of the present patent could easily be invented by those skilled in the art in reference to the inventions described in Evidence A No.1 to Evidence A No.7.

[Claim 3]

a) Comparing the invention related to Claim 3 of the present invention with the invention described in Evidence A No.3 shows that "the face part 76" in Evidence A No.3 corresponds to "the face plate" of Claim 3 of the present invention and "the shadow mask 74" in Evidence A No.3 corresponds to "the color selection mask" of Claim 3 of the present invention, respectively. Then, Evidence A No.3 discloses the color cathode ray tube having the curved surface shadow mask 74 arranged in opposite to the inner surface of the face plate 76. The face plate 76 is "flat surface" and in Fig.10 is illustrated the cathode ray tube 72 having the face plate 76 acknowledged that the inner and outer surfaces are substantially flat surfaces and its thickness is substantially uniform and having a shadow mask 74 with its side facing against the face plate 76 being a convex surface. Accordingly, Evidence A No.3 discloses all the composing elements E, F and G specifying the invention related to Claim 3 of the present patent.

Accordingly, the invention related to Claim 3 of the present patent is the same as the invention described in Evidence A No.3.

Even if they are not the same to each other, it is apparent that the invention related to Claim 3 of the present patent could easily be invented by those skilled in the art in reference to the invention described in Evidence A No.3.

b) Comparing the invention related to Claim 3 of the present invention with the invention described in Evidence A No.8 shows that "the face plate (1)" in Evidence A No.8 corresponds to "the face plate" of Claim 3 of the present invention and "the shadow mask (2)" in Evidence A No.8 corresponds to "the color selection mask" in Claim 3 of the

present invention. Then, Evidence A No.8 discloses the color cathode ray tube having the convex surface shadow mask (2) arranged while being oppositely faced against the inner surface of the face plate (1). The face plate 74 is made as "a flat surface", and in Fig.2 is illustrated a color cathode ray tube having a face plate (1) with its inner and outer surfaces being acknowledged substantially flat surface and with its thickness being substantially uniform, and a shadow mask (2) with a side facing against the face plate (1) being convex.

Further, the face plate (1) illustrated in Fig.2 of Evidence A No.8 is a plate-like member and the face plate 10 practically illustrated in Fig.2 of the present patent is a container-like member. However, Claim 3 of the present patent does not literally eliminate the plate-like face plate as disclosed in Evidence A No.8, whether or not the shape of the face plate is either a plate-like member or a container-like member merely consists in a difference of a connecting location between the face plate and the funnel and there is no substantial difference between the face plate and the color selection mask pointed out in Claim 3 in reference to its space.

Accordingly, Evidence A No.8 discloses all the composing elements E, F and G specifying the invention related to Claim 3 of the present patent.

Accordingly, the invention related to Claim 3 of the present patent is the same as the invention described in Evidence A No.8.

Even if they are not the same to each other, it is apparent that the invention related to Claim 3 of the present patent could easily be invented by those skilled in the art in reference to the invention described in Evidence A No.8.

c) The patentee might insist that the color selection mask in the invention specifying composing element F "has a convex curvature facing toward the face plate" with its thickness being substantially uniform, thereby it produces an effect (line 2 from the last line in page 6 to line 2 in page 7 of "Description of Circumstances on Accelerated Examination" submitted on July 26, 1999) saying "that is, the color cathode ray tube has a color selection mask in such a way that the distance between the face plate and the color selection mask becomes elongated as it approaches toward the periphery in a horizontal direction of the face plate, resulting in that either a grouping or a de-grouping is hardly produced" and that such an effect as above is not described at all in Evidence A Nos.3 and 8, so that the invention related to Claim 3 is not the same as the inventions described in these evidences and it could not easily be invented in reference to these inventions. However, the opponent insists that such an insistence as above is not appropriate in view of the same reasons as described in "e)" corresponding to [Claim 1].

At first, the aforesaid effect is not described at all in the specification and the drawings of the present patent.

Secondly, in reference to the descriptions of Evidence A No.5 and Evidence A No.6, those skilled in the art could easily estimate such effects as above.

Thus, the invention related to Claim 3 of the present patent could be easily attained under a combination of the inventions described in Evidence A No.3 and Evidence A No.8 with the inventions described in Evidence A No.5 and Evidence A No.6.

[Claim 4]

The specifying composing element H described in Claim 4 of the present patent is the same as the specifying composing element D described in Claim 2 and this is described in Evidence A No.3 and Claim 7 as already described in the aforesaid [Claim 2].

In addition, the element related to Claim 3, cited in Claim 4 is the same as the description in Claim 3.

Then, the invention related to Claim 4 of the present patent is the same as the invention described in Evidence A No.3.

Even if they are not the same to each other, it is apparent that the invention related to Claim 4 of the present patent could easily be invented by those skilled in the art in reference to the invention described in Evidence A No.3.

Further, the invention related to Claim 4 of the present patent could easily be invented by those skilled in the art in reference to the inventions described in Evidence A No.5 to Evidence A No.8.

(5) Conclusion

As described above, since the invention related to Claim 1 of the present patent could easily be invented by those skilled in the art in reference to the inventions described in Evidence A No.1 to Evidence A No.4, it cannot be granted for patent under the provision of Item No.2 of Article 29 of the Patent Law.

In addition, since the invention related to Claim 1 of the present patent could easily be invented by those skilled in the art in reference to the inventions described in Evidence A No.1 to Evidence A No.6, it cannot be granted for patent under the provision of Item No.2 of Article 29 of the Patent Law.

Since the invention related to Claim 2 of the present patent could easily be invented by those skilled in the art in reference to the inventions described in Evidence A No.1 to Evidence A No.4 and Evidence A No.7, it cannot be granted for patent under the provision of Item No.2 of Article 29 of the Patent Law.

In addition, since the invention related to Claim 2 of the present patent could easily be invented by those skilled in the art in reference to the inventions described in Evidence A No.1 to Evidence A No.7, it cannot be granted for patent under the provision of Item No.2 of Article 29 of the Patent Law.

Since the invention related to Claim 3 of the present patent could easily be invented by those skilled in the art in reference to the inventions described in Evidence A No.3, it cannot be granted for patent under the provision of Item No.2 of Article 29 of the Patent Law. In addition, since the patented invention related to Claim 3 of the present patent could easily be invented by those skilled in the art in reference to the invention described in Evidence A No.3, it cannot be granted for patent under the provision of Item No.2 of Article 29 of the Patent Law.

Additionally, since the patented invention related to Claim 3 of the present patent is the same as the invention described in Evidence A No.8, it cannot be granted for patent under the provision of Item No.2 of Article 29 of the Patent Law. Further, since the patented invention related to Claim 3 of the present patent could easily be invented by those skilled in the art in reference to the invention described in Evidence A No.8, it cannot be granted for patent under the provision of Item No.2 of Article 29 of the Patent Law.

Further, since the patented invention related to Claim 3 of the present patent could easily be invented by those skilled in the art in reference to the invention described in Evidence A No.3, Evidence A No.5, Evidence A No.6 and Evidence A No.8, it cannot be granted for patent under the provision of Item No.2 of Article 29 of the Patent Law.

Since the patented invention related to Claim 4 of the present patent is the same as the invention described in Evidence A No.3, it cannot be granted for patent under the provision of Item No.2 of Article 29 of the Patent Law. In addition, since the patented invention related to Claim 4 of the present patent could easily be invented by those skilled in the art in reference to the invention described in Evidence A No.3, it cannot be granted for patent under the provision of Item No.2 of Article 29 of the Patent Law.

Further, since the patented invention related to Claim 4 of the present patent could easily be invented by those skilled in the art in reference to the inventions described in Evidence A No.3, Evidence A No.5 to Evidence A No.8, it cannot be granted for patent under the provision of Item No.2 of Article 29 of the Patent Law.

Accordingly, all the patents related to Claims 1 to 4 should be cancelled under the provision of No.2, Item No.1 of Article 113 of the Patent Law

4. Proof

- (1) Evidence A No.1: Gazette of Patent Laid-Open No.Hei 7-
142012
- (2) Evidence A No.2: Gazette of Patent Laid-Open No.Hei 2-
148544
- (3) Evidence A No.3: Gazette of Patent Laid-Open No.Sho 51-
118956
- (4) Evidence A No.4: Gazette of Patent Laid-Open No.Sho 62-
213044
- (5) Evidence A No.5: Gazette of Patent Laid-Open No.Sho 52-
43359
- (6) Evidence A No.6: Gazette of Patent Laid-Open No.Sho 61-
158651
- (7) Evidence A No.7: Gazette of Patent Laid-Open No.Sho 64-
77841
- (8) Evidence A No.8: Gazette of Patent Laid-Open No.Sho 50-
106561

5. List of the Attached Documents

- (1) Copies of Evidence A No.1 Each of one original and to Evidence A No.8
two copies
- (2) Notice of Opposition to Two copies
Patent

Notice of Reasons for Cancellation

November 21, 2000

Patent Opposition No. Opposition 2000-72456
(Patent No.) (Patent No.2,993,437)
Date of draft November 8, 2000
Presiding judge Trial examiner of the Patent Office
Yoshinori Hirai
Patentee Sony Corporation

As a result of consultation, it is deemed that the patent related to the following "Claims 1 to 4" should be cancelled on the basis of the following reasons. If the patentee has a certain argument against this decision, it is requested for the patentee to submit one original and three copies of the written answer within 60 days from the date of dispatch of this notice.

Reasons

Publication No.1: Gazette of Patent Laid-Open No.Hei 6- 36710

(Evidence A No.1 submitted by the patent opponent Teruo Itoh)

Publication No.2: Gazette of Patent Laid-Open No.Sho 53- 83572

(Evidence A No.2 submitted by the patent opponent Teruo Itoh)

Publication No.3: Gazette of Patent Laid-Open No.Sho 51- 118956

(Evidence A No.3 submitted by the patent opponent Taiko Tohyama)

Publication No.4: Gazette of Patent Laid-Open No.Hei 7- 99030

(Evidence A No.4 submitted by the patent opponent Teruo Itoh)

In the aforesaid publication No.1 is described as follows.

[0001] [Field of the Invention] This invention relates to the structure of the cathode-rays display tube used for television and others.

[0011] In drawing 1, the cathode rays 5 (in the case of the color CRT, they are three electron beams) which 6 is were emitted from the electron gun 4 are deflected and

scanned by the deflecting coil 6. And in the case of color TV, three electron beams reach the fluorescence phosphor 3 of three primary colors through shadow mask and project a picture on fluorescence screen.

[0014] Therefore, as shown in the drawing 1 of this invention, the fluorescence screen surface which an electron beam is irradiated and emits light is constructed as concave structure seen from inside of a tube as well the conventional case (as convex seen from the outside of a tube). By making the outer surface of the tube flat or concave, the concave lens structure is constituted by the vitreous material sandwiched between the both sides or surfaces. By operation of the concave lens structure constituted like this, the picture projected on a fluorescence screen is made into more near a flat image.

In the aforesaid publication No.2 is described as follows.

(Lower left column line 3 to lower right column line 3 in page 2)

The 3rd figure shows the changes of shadow mask hole pitch a to distance d from the mask center of the shadow mask (3) that is used with the color cathode ray tube of this invention.

The vertical axis of the figure is the ratio with pitch a of the periphery to central pitch a0 and the horizontal axis is distance d.

Individually, the 3rd Figure A shows the condition where a pitch changed continuously and the 3rd Figure B shows the condition where a pitch changed uncontinuously.

In the example of the color cathode ray tube of 26 inches of the deflection angle of 110 degrees, the central pitch is 0.762 mm and the pitch of the periphery is 0.991 mm with $1.30\frac{a_0}{a}$ in the position of $d=250$.

It is

$$a/a_0 = b_0 + b_1r + b_2r + b_3r^2 \dots$$

$$r = d/100$$

$$b_0 = 1.0000000$$

$$b_1 = -0.00386$$

$$b_2 = 0.0604469$$

$$b_3 = -0.0043711$$

in the example of the 3rd Figure A.

It is important that it is $a > a_0$ about the change of a pitch, and that is the next relation.

$$d \cdot d(a/b_0) / dr \cdot r > 0$$

(Lines 13 to 17, upper left column page 3)

The curvature radius of the phosphor screen (2) of the 4th figure is 1,033.78 mm.

The curvature radius of shadow mask A that is shown with the alternate long and short dash line of the section that includes the tube axis and long side axis of this invention is 84.56 mm.

(Lines 2 to 6, upper right column page 3)

The form of the section including the tube axis of the shadow mask can have simple, for example regular curvature radius, because indeed the pitch of shadow mask A has been enlarged to periphery from the center of shadow mask A, as shown in the 3rd figure like this.

In the aforesaid publication No.3 is described as follows.

(Lines 1 to 4, lower right column page 1)

The plural electron beam, that was focused, in such a shadow mask cathode ray tube that produces a/the color picture is projected to a mosaic form phosphor screen through the color selection shadow mask that has many slits.

(Lines 17 lower right column in page 3 to lines 14 upper left column in page 4)

The geometrical relation of every part of the certain shadow mask cathode ray tube is shown in the 7th figure. Like the 1st figure, line P-P shows the deflection face in a/the zero deflection. The distance between plane P-P and screen 32 are shown as "L" and the distance between shadow mask 34 and screen 32 are shown as "q". Furthermore, "s" shows the distance in deflection face P-P from center 54 of a/the central axis line A-A to electron beam and also "a" shows the center-center intervals of 2 slits of mask 34. The aforementioned measure has the relation as shown in the next formula in a rough estimate.

$$q = L \cdot a / 3s$$

The big change is given by "q", by giving bigger curvature to shadow mask 56 than it is seen with a conventional cathode ray tube, in order to decrease the effect of the doming in

this invention. Simultaneously, proportioning to "q" even the value of "a" is changed.

(Lines 9 to 14 upper right column in page 4)

As shown in the 9th figure, No. 9A figure, No. 9B figure and also No. 9C figure, in shadow mask 56 of the curvature radius of 850 mm that are the embodiment of this invention, the distance "a" between the center of the slit is gradually increasing to the way that are 0.77 mm in central point 66 and are 0.885 mm in intermediate point 68 and are 1000 mm in periphery position 70, respectively.

(Lines 7 lower left column to line 9 lower right column in page 4)

The ratio of the distance (q) from mask to screen for 2 type of conventional CRTs and 2 type of CRTs that was produced according to this invention are shown in Table A.

The 1st line shows the ratio of q in the center (of the mask) and q in the edge on the long axis of the mask face. And, the 2nd line shows the same ratio on the diagonal line of the mask face, respectively.

[Table A]	long axis q/ center q	diagonal line q/ center q
19 in. 90° deflection conventional CRT	1.13	1.12
25 in. 110° deflection conventional CRT	1.10	1.09
25 in. No.1 CRT	1.47	1.45
25 in. No.2 CRT	1.58	1.48

It is understood that the ratio of the periphery q/ center q of the CRT in this invention gets much larger than the same ratio in the conventional CRT.

It is also understood that both of the ratio of the periphery q/ center q in the 2 CRTs in this invention are larger than 1.15. When the curvature of the shadow mask is increased from the radius of 1000 mm to the radius of 850 mm, each the doming, the blister strain and the position difference (gap) based on these phenomena decreases.

When the curvature of the mask increases, the strength thereof increases.

(Lines 5 to 16 upper right column in page 5)

The increase of the common difference in the CRT of this invention depends on the increase of the interval "a", and the decrease of the position difference depends on the increase of the curvature of the shadow mask. Therefore, the position difference in the position where the influence of doming appears most drastically on the screen decreases

remarkably by increasing the curvature and the interval "a" of the shadow mask.

Although the shadow mask with regard to the curved shape face plate is described in the aforementioned explanation of which the curvature is increased and the interval "a" is changed, the concept of this invention is also applicable to the flat shape face plate.

(Lines 4 to 10 lower left column in page 5)

In the 10th figure, cathode ray tube 72 is shown with curved surface shadow mask 74 and flat shape face plate 76. In this cathode ray tube, the interval "q" virtually increases as it goes from center to periphery of the shadow mask, and also the interval "a" of the mask slit similarly increases in order to maintain the sufficient phosphor line pattern on the screen.

In the aforesaid publication No.4 is described as follows.

(Refer to [0017])

The color picture tube of this invention is equipped with the bulb containing the flat-surface glass panel section, and the flat-surface-like shadow mask which counters at the aforementioned flat-surface glass panel section in the aforementioned bulb, and more it has the configuration with at least one-layer of resin layer bonded with on the outside surface of the aforementioned flat-surface glass panel.

(Refer to [0021])

Drawing 1 shows the cross section of the color picture tube which is one example of this invention. As shown in drawing 1, this color picture tube is equipped with the bulb 11 containing the flat-surface glass panel section 3 (it is hereafter written as flat-surface panel) which has substantially uniform thickness.

(As to the invention related to Claim 1)

Comparing the invention related to Claim 1 with the invention described in the publication No.1 shows that these inventions are different from each other in view of the fact that the color selecting mask in the former invention has a convex curvature larger than a curvature at an inner surface of the face plate and the color selecting mask in the latter invention has no description at all. However, since the color cathode ray tube with

the curvature of the color selecting mask being a convex curvature larger than a curvature at the inner surface of the face plate is well known as found in the publication Nos.2, 3, the aforesaid differences are matters that can be easily attained by those skilled in the art by applying the well-known art described in the publication Nos.2, 3 to the invention described in the publication No.1.

(As to the invention related to Claim 2)

A technical point that a space between the openings defined by the invention related to Claim 2 is made wide as it is directed toward the peripheral part in a horizontal direction of the face plate is well known as described in the publication Nos.2, 3 and this is a matter that those skilled in the art can easily attain.

(As to the invention related to Claim 3)

Comparing the invention related to Claim 3 with the invention illustrated in FIG.10 of the publication No.3 shows that these inventions are different from each other in view of the fact that the thickness of the face plate is substantially uniform in the former invention, and the latter invention merely has a description of a planer face plate and has no description about the thickness. However, since the color cathode ray tube with a substantial uniform thickness as the planer face plate is well known as described in the publication No.4, the aforesaid differences are matters that can be easily attained by those skilled in the art by applying the well-known art described in the publication No.4 to the invention described in the publication No.3.

(As to the invention related to Claim 4)

A technical point that a space between the openings defined by the invention related to Claim 4 is made wide as it is directed toward the peripheral part in a horizontal direction of the face plate is described in the publication No.3 and this matter is not a specific one.

Accordingly, the inventions related to Claims 1 to 4 could easily invented by those skilled in the art on the basis of the inventions described in the publication Nos.1 to 4.

Thus, the grant of patent for the inventions related to Claims 1 to 4 is made in contravention of the provision of Item No.2 of Article 29 of the Patent Law.

Any inquiry in regard to this notice should be informed to the following section.

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特許庁審査部
第一審査課

Dispatch No.027358

Date of Dispatch: May 18, 2001

Official Decision on Opposition to Grant of Patent

Patent Opposition No.2000-72456

7-35, Kitashinagawa 6-Chome, Shinagawa-Ku, Tokyo

Patentee: Sony Corporation

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Opponent: Taiko Tohyama

In regard to the filing of opposition to grant of patent relating to Claims 1 to 4 of Patent No.2,993,437 with a title of "Glass Bulb for Color Cathode Ray Tube and Color Cathode Ray Tube", it is decided as follows.

Conclusion

It is deemed that the amendment is acknowledged.

It is decided that the patent relating to Claims 1 and 2 of Patent No.2,993,439 is kept on file.

Reasons

1. Background of the procedure

The patent application on the inventions related to Claims 1 to 4 of Patent No.2,993,437 as filed on August 23, 1996, its registration for setting of a patent right was filed on October 22, 1999 in regard to the inventions, and after this registration, the filing of opposition to grant of patent against Claims 1 to 4 by the opponents Teruo Itoh and Taiko Tooyama, the reasons for its cancellation was noticed and a request for correction was filed on January 15, 2001 within a specified period.

2. Judgment about adaptation of the correction

2-1. Content of the correction

A content of the correction requested by the patentee is indicated in (a) to (c) as follows.

(a) In the Claim 1, correct

“(A). a glass bulb in which the external surface of the effective display area of the face plate is substantially flat and the internal surface of the effective display area of the face plate has the concave curvature toward the following color selection mask, and”

to

“(A). a glass bulb in which the external surface of the effective display area of the face plate is substantially flat and the internal surface of the effective display area of the face plate has the concave curvature toward the following color selection mask and the thickness(T) of the peripheral area in the horizontal direction of the effective display area of the face plate is selected as $T=1.2 \times T_0 \sim 1.3 \times T_0$, when the thickness of the center of the effective display area is T_0 , and”

(b) In the paragraph [0009] of the detailed description of the invention, correct

『In view of attaining the second object of the present invention explained above, the color picture tube of the present invention is characterized in providing:

(A) a glass bulb in which the external surface of the effective display area of the face plate is substantially flat, and

(B) a color selection mask having the curvature projected toward the face plate provided opposed to the internal surface of the face plate within said glass bulb.]

to

『In view of attaining the second object of the present invention explained above, the color picture tube of the present invention is characterized in providing:

(A) a glass bulb in which the external surface of the effective display area of the face plate is substantially flat and the internal surface of the effective display area of the face plate has the concave curvature toward the following color selection mask and the thickness(T)of the peripheral area in the horizontal direction of the effective display area of the face plate is selected as $T=1.2\times T_0 \sim 1.3\times T_0$, when the thickness of the center of the effective display area is T_0 , and

(B) a color selection mask having the curvature projected toward the face plate provided opposed to the internal surface of the face plate within said glass bulb, in which said projected curvature is bigger than that of said internal surface of the face plate.]

(c) Delete Claims 3 and 4.

2-2. Adaptation about object of the correction, presence or absence of a new matter and existence of expansion and reduction of claim:

As a description relating to the matter of correction of the above (a), the paragraph [0007] in the specification attached to the petition has a description that "when a thickness at a horizontal circumference in an effective screen region of a face plate is defined as T and a thickness of the central part of the effective screen region is defined as T_0 , it is preferable that a relation of $T = 1.2T_0$ to $1.3T_0$ ", and similarly the paragraph [0008] has a description that "in addition, in regard to the inner surface of the face plate, even if the thickness at the horizontal circumferential side in the effective screen region is made thicker than the thickness at the central part by 20 to 30% (for example, 3 to 5 mm), it is added with a phenomenon where the peripheral part is seen in a slight floated state due to an effect of refraction, resulting in that the face plate is seen substantially as a flat surface with bare eyes. Thus, it is deemed that the fact that "when a thickness at a

horizontal circumference in an effective screen region of a face plate is defined as T and a thickness of the central part of the effective screen region is defined as T₀, they satisfy a relation of T = 1.2T₀ to 1.3T₀" is within a range of description of the item described in the specification attached to the petition. Accordingly, the corrected item in the above (a) aims at reduction of the claim, but does not add any new matter and also it does not substantially expand or change the claim.

Since the corrected item in the above (b) is a correction of the detailed description of the invention accompanied by the correction of the claim through the corrected item of the above (a), it aims at an interpretation of un-clear description, it does not form any addition of the new matter and it does not substantially extent or change the claim.

Since the corrected item in the above (c) is a deletion of the claim, it aims at a reduction of the, it does not form any addition of the new matter and it does not substantially extent or change the claim.

2-3. Conclusion

Accordingly, the aforesaid correction is adapted for the provisions of Item Nos. 2 and 3 of Article 126 correspondingly applied for Item Nos. 2 and 3 of Article 120 (4) of the Patent Law, so that it is deemed that the correction is acknowledged.

3. Judgment on the filing of opposition to grant of patent

3-1. Summary of opposition to grant of patent

(a) Opponent Teruo Itoh submitted Evidence A Nos. 1 - 4 as follows and insisted that the inventions relating to Claims 1 to 4 could easily be invented by those skilled in the art in reference to the inventions described in Evidence A Nos. 1 to 4 and the patent on the inventions related to Claims 1 to 4 should be cancelled due to its contravention against the provision of Item No.2 of Article 29 of the Patent Law.

Evidence A No.1: Gazette of Japanese Patent Laid-Open No.Hei 6-36710

Evidence A No.2: Gazette of Japanese Patent Laid-Open No.Sho 53-83572

Evidence A No.3: "RCA Picture Tubes" (Copyright 1980) RCA Corporation, pages 45 · 49, "Contoured-line screens for new in-line color picture tubes"

Evidence A No.4: Gazette of Japanese Patent Laid-Open No.Hei 7-99030

(b) Opponent Taiko Tohyama submitted Evidence A Nos. 1 - 8 as follows and insisted that the inventions relating to Claims 1 to 4 could easily be invented by those skilled in the art in reference to the inventions described in Evidence A Nos. 1 to 8 and the patent on the inventions related to Claims 1 to 4 should be cancelled due to its contravention against the provision of Item No.2 of Article 29 of the Patent Law, and further the invention related to Claims 3, 4 is the same as the invention described in Evidence A No.3 or Evidence A No.8 and the patent of the invention related to Claims 3, 4 was granted in contravention against the provision of No.3 of Item No.1 of Article 29 of the Patent Law, so that it should be cancelled.

Evidence A No.1: Gazette of Japanese Patent Laid-Open No.Hei 7-142012

Evidence A No.2: Gazette of Japanese Patent Laid-Open No.Hei 2-148544

Evidence A No.3: Gazette of Japanese Patent Laid-Open No.Sho 51-118956

Evidence A No.4: Gazette of Japanese Patent Laid-Open No.Sho 62-213044

Evidence A No.5: Gazette of Japanese Patent Laid-Open No.Sho 52-43359

Evidence A No.6: Gazette of Japanese Patent Laid-Open No.Sho 61-158651

Evidence A No.7: Gazette of Japanese Patent Laid-Open No.Sho 64-77841

Evidence A No.8: Gazette of Japanese Patent Laid-Open No.Sho 50-106561

3-2. Present Invention

The present invention related to Claims 1, 2 of Patent No.2,993,437 is defined as follows while being specified by the items described in Claims 1, 2 of the corrected specification.

『 [Claim 1]

A cathode ray tube comprising;

(A) a glass bulb in which the external surface of the effective display area of the face plate is substantially flat and the internal surface of the effective display area of the face plate has the concave curvature toward the following color selection mask and the thickness(T) of the peripheral area in the horizontal direction of the effective display area of the face plate is selected as $T=1.2 \times T_0 \sim 1.3 \times T_0$, when the thickness of the center of

the effective display area is T_0 , and

(B) a color selection mask having the curvature projected toward the face plate provided opposed to the internal surface of the face plate within said glass bulb, in which said projected curvature is bigger than that of said internal surface of the face plate.

(Hereinafter refer to as "the present invention 1")

[Claim 2]

A cathode ray tube according to claim 1, said color selection mask has a plurality of slits, in which the space between adjacent slits are gradually widened toward the peripheral area in the horizontal direction of the face plate.

(Hereinafter refer to as "the present invention 2")

3-3. Inventions described in each of the publications of each of Evidences

(a) In the Evidence A No.1 submitted by the opponent Teruo Itoh is described as follows.

『 [Field of the Invention] This invention relates to the structure of the cathode-rays display tube used for television and others. 』 (paragraph [0001])

『 In drawing 1, the cathode rays 5 (in the case of the color CRT, they are three electron beams) which 6 is were emitted from the electron gun 4 are deflected and scanned by the deflecting coil 6. And in the case of color TV, three electron beams reach the fluorescence phosphor 3 of three primary colors through shadow mask and project a picture on fluorescence screen. 』 .(paragraph [0011])

『 Therefore, as shown in the drawing 1 of this invention, the fluorescence screen surface which an electron beam is irradiated and emits light is constructed as concave structure seen from inside of a tube as well the conventional case (as convex seen from the outside of a tube). By making the outer surface of the tube flat or concave, the concave lens structure is constituted by the vitreous material sandwiched between the both sides or surfaces. By operation of the concave lens structure constituted like this, the picture projected on a fluorescence screen is made into more near a flat image. 』
(paragraph [0014])

In the Evidence A No.2 is described as follows.

『 The 3rd figure shows the changes of shadow mask hole pitch a to distance d from the

mask center of the shadow mask (3) that is used with the color cathode ray tube of this invention.

The vertical axis of the figure is the ratio with pitch a of the periphery to central pitch a_0 and the horizontal axis is distance d .

Individually, the 3rd Figure A shows the condition where a pitch changed continuously and the 3rd Figure B shows the condition where a pitch changed uncontinuously.

In the example of the color cathode ray tube of 26 inches of the deflection angle of 110 degrees, the central pitch is 0.762 mm and the pitch of the periphery is 0.991 mm with $1.30a_0$ in the position of $d=250$.

It is

$$a/a_0 = b_0 + b_1r + b_2r + b_3r^2 \dots$$

$$r = d/100$$

$$b_0 = 1.0000000$$

$$b_1 = -0.00386$$

$$b_2 = 0.0604469$$

$$b_3 = -0.0043711$$

in the example of the 3rd Figure A.

It is important that it is $a > a_0$ about the change of a pitch, and that is the next relation.

$$d^2(a/a_0)/dr^2 > 0 \quad \text{J} \quad (\text{Lower left column line 3 to lower right column line 3 in page 2})$$

『The curvature radius of the phosphor screen (2) of the 4th figure is 1,033.78 mm.

The curvature radius of shadow mask A that is shown with the alternate long and short dash line of the section that includes the tube axis and long side axis of this invention is 84.56 mm. J (Lines 13 to 17, upper left column page 3)

『The form of the section including the tube axis of the shadow mask can have simple, for example regular curvature radius, because indeed the pitch of shadow mask A has been enlarged to periphery from the center of shadow mask A, as shown in the 3rd figure like this. J (Lines 2 to 6, upper right column page 3)

In the Evidence A No.3 is described as follows.

『The mask curvature cannot be arbitrarily changed since the curvature of the mask is established by the curvature of the faceplate and the proper tube geometry to insure the

correct nesting of the phosphor trios as shown in Fig. 8. Specifically, the mask curvature varies from that of the faceplate such that the spacing q obeys the equation (Fig. 8):

$$q = La/3s$$

where q is the space between the mask and the faceplate; L is the distance from the screen to the deflection plane; a is the spacing between slits in the mask; and s is the beam spacing at the deflection plane. Or, by letting $k = L/3s$ (constants for a given tube)

$$q = ka$$

Therefore, under normal conditions, q is established by the given tube parameters and it is not obvious that the curvature of the shadow mask can be modified. However, if the parameter a is allowed to vary between the center and the edge of the screen with a larger value at the edge than at the center, the q would also change in a similar manner. Thus, if a increases from center to edge, q will increase proportionally, resulting in a mask with a greater curvature. This greater mask curvature will change less for a given temperature change of the mask. ↳ (Lines 14 left column to line 7 middle column in page 47)

In the Evidence A No.4 is described as follows:

『The color picture tube of this invention is equipped with the bulb containing the flat-surface glass panel section, and the flat-surface-like shadow mask which counters at the aforementioned flat-surface glass panel section in the aforementioned bulb, and more it has the configuration with at least one layer of resin layer bonded with on the outside surface of the aforementioned flat-surface glass panel.』 (paragraph [0017])

『Drawing 1 shows the cross section of the color picture tube which is one example of this invention. As shown in drawing 1, this color picture tube is equipped with the bulb 11 containing the flat-surface glass panel section 3 (it is hereafter written as flat-surface panel) which has substantially uniform thickness.』 (paragraph [0021])

(b) In the Evidence A No.1 submitted by the opponent Taiko Tohyama is described as follows.

『[Claim 1] A glass bulb for a cathode ray tube including a glass panel part comprised of a substantial rectangular-shaped face part constituting a display screen and a skirt

part extending substantially in a vertical direction from a circumferential edge part of said face part, a funnel-like funnel part sealingly connected to said glass panel part, and a neck part of root segment of said funnel part storing an electron gun characterized in that when glass thickness at each of the center of the effective screen part of the face of said glass panel and the location near its end part is defined as t_0 and t_d , respectively, a compression stress layer having a thickness with a relation of $1.0 \leq t_d/t_0 \leq 1.2$ on an orthogonal line at said face part and having a value more than $t_0/10$ at the inner surface is formed. 】 (claim)

『However, in the aforementioned conventional glass bulb for cathode-ray tubes, if the radius of curvature of a glass panel is made small in order to raise the intensity to impact, it will be bad invisible and will be hard to see a screen. For this reason, flatness of a face is demanded, and it is necessary to carry out the flattening of the screen and to make it legible as radius of curvature which is about $1.5R\cdot2R$. However, if the flattening of the face is carried out in this way, the problem become weak to a mechanical shock will arise. 】 (paragraph [0007])

『Moreover, if the whole face section is thickened, a weight will become heavy and handling nature will benefit reinforcement bad. In order to cope with this point, the configuration which made the outside surface of the face section the flat, made the radius of curvature of an internal surface small, and made heavy-gage the face circumference section, especially the corner section of four corners is used. By such configuration, although mitigation of the whole weight is achieved, a difference arises in permeability by the difference in the thickness in a face center section and the circumference section, the brightness difference of a picture image becomes large, and the problem that a display quality deteriorates is produced. 】 (paragraph [0009])

In the Evidence A No.2 is described 『A shadow mask system color cathode ray tube characterized in that the same has a face display with its inner surface forming a substantial spherical surface or a cylindrical surface having a limited radius of curvature and its outer surface forming a substantial flat surface.】 (claim).

In the Evidence A No.3 are described as follows;

『The plural electron beam, that was focused, in such a shadow mask cathode ray tube

that produces a/the color picture is projected to a mosaic form phosphor screen through the color selection shadow mask that has many slits.』 (Lines 1 to 4, lower right column page 1)

『The geometrical relation of every part of the certain shadow mask cathode ray tube is shown in the 7th figure. Like the 1st figure, line P-P shows the deflection face in a/the zero deflection. The distance between plane P-P and screen 32 are shown as "L" and the distance between shadow mask 34 and screen 32 are shown as "q". Furthermore, "s" shows the distance in deflection face P-P from center 54 of a/the central axis line A-A to electron beam and also "a" shows the center-center intervals of 2 slits of mask 34. The aforementioned measure has the relation as shown in the next formula in a rough estimate.

$$q = L * a / 3s$$

The big change is given by "q", by giving bigger curvature to shadow mask 56 than it is seen with a conventional cathode ray tube, in order to decrease the effect of the doming in this invention. Simultaneously, proportioning to "q" even the value of "a" is changed.』 (Lines 17 lower right column in page 3 to lines 14 upper left column in page 4)

『As shown in the 9th figure, No. 9A figure, No. 9B figure and also No. 9C figure, in shadow mask 56 of the curvature radius of 850 mm that are the embodiment of this invention, the distance "a" between the center of the slit is gradually increasing to the way that are 0.77 mm in central point 66 and are 0.885 mm in intermediate point 68 and are 1000 mm in periphery position 70, respectively.』 (Lines 9 to 14 upper right column in page 4)

『The ratio of the distance (q) from mask to screen for 2 type of conventional CRTs and 2 type of CRTs that was produced according to this invention are shown in Table A. The 1st line shows the ratio of q in the center (of the mask) and q in the edge on the long axis of the mask face. And, the 2nd line shows the same ratio on the diagonal line of the mask face, respectively.

[Table A]	long axis q/ center q	diagonal line q/ center q
19 in. 90° deflection conventional CRT	1.13	1.12
25 in. 110° deflection conventional CRT	1.10	1.09
25 in. No.1 CRT	1.47	1.45

25 in. No.2 CRT

1.58

1.48

It is understood that the ratio of the periphery q/ center q of the CRT in this invention gets much larger than the same ratio in the conventional CRT.

It is also understood that both of the ratio of the periphery q/ center q in the 2 CRTs in this invention are larger than 1.15. When the curvature of the shadow mask is increased from the radius of 1000 mm to the radius of 850 mm, each the doming, the blister strain and the position difference (gap) based on these phenomena decreases.

When the curvature of the mask increases, the strength thereof increases.』 (Lines 7 lower left column to line 9 lower right column in page 4)

『The increase of the common difference in the CRT of this invention depends on the increase of the interval "a" , and the decrease of the position difference depends on the increase of the curvature of the shadow mask. Therefore, the position difference in the position where the influence of doming appears most drastically on the screen decreases. remarkably by increasing the curvature and the interval "a" of the shadow mask.

Although the shadow mask with regard to the curved shape face plate is described in the aforementioned explanation of which the curvature is increased and the interval "a" is changed, the concept of this invention is also applicable to the flat shape face plate.』 (Lines 5 to 16 upper right column in page 5)

『In the 10th figure, cathode ray tube 72 is shown with curved surface shadow mask 74 and flat shape face plate 76. In this cathode ray tube, the interval "q" virtually increases as it goes from center to periphery of the shadow mask, and also the interval "a" of the mask slit similarly increases in order to maintain the sufficient phosphor line pattern on the screen.』 (Lines 4 to 10 lower left column in page 5)

In the Evidence A No.4 are described 『A color cathode ray tube comprised of an inline type electron gun, a stripe type fluorescent screen and a slot type shadow mask characterized in that said shadow mask is formed with a folded line directed with said fluorescent screen side being protruded on an X-axis line passing through a tube axis or on a line in parallel with an X-axis at a symmetrical X-axis position near it.』 (claim).

『In addition, the radius curvature in the direction of X-axis ... is formed to have a radius of curvature smaller than the radius of curvature by a predetermined length. 』 (refer to

lines 12 to 18 in the left upper column in page 3).

『A pitch $P(x, y)$ at each of the portions on the shadow mask (6) in this preferred embodiment is determined by the following equation: $P(x, y) = (a + bx^m)(1 + cy)$ 』 (lines 6 to 8 in the right upper column in page 3).

In the Evidence A No.5 are described 『A color cathode ray tube characterized in that a fluorescent screen facing, through a shadow mask, against an electron gun for radiating three electron beams within one horizontal plane is arranged in an inner surface forming a substantial spherical surface of the face plate, an inter-distance between said shadow mask and said inner surface in a conical beam lotus with a deflection angle of the central electron beam being kept constant on a central horizontal axis is made large as compared with that on the central vertical axis』 (claim),

『The present invention relates to a color cathode ray tube provided with an inline electron gun for radiating three electron beams in one horizontal plane. ... fluorescent dot trios were adjacent to each other at a peripheral part on the central horizontal axis X-X and there occurred a possibility that a certain color shift was generated』 (refer to line 14, left lower column in page 1 to line 4, left lower column in page 2).

『As shown in FIG.5, ... it may be formed into a torus. 』 (refer to lines 8 to 17, left upper column in page 3)

In the Evidence A No.6 are described 『A color Braun tube comprised of a shadow mask having many through holes arranged in a horizontal direction and a direction crossing at an angle of 60° with this horizontal direction; a fluorescent surface having triple-color fluorescent substance arranged at the inner surface of a panel oppositely spaced apart by a predetermined distance against the shadow mask in correspondence with each of the through holes of said shadow mask; and an electron gun for radiating electron beams incident to the triple-color fluorescent substances corresponding to the through holes characterized in that arranging spaces in a horizontal direction of triple-color fluorescent substances in at least of an orthogonal portion of a rectangular screen formed on said fluorescent surface under incidence of said electron beams and a peripheral part in a vertical direction is larger than an arrangement space in a horizontal direction at the central part of the screen. 』 (claim), and

『Arrangement of such fluorescent substances (B), (G) and (R) as above can be easily attained normally by reducing the radii of curvature in a direction of vertical axis and a direction of orthogonal axis than a radius of curvature in a direction of horizontal axis in respect to a shadow mask formed in the same curvature in a direction of horizontal axis, a direction of vertical axis and a direction of orthogonal axis and by increasing spaces between the panel (5) and the shadow mask (22) at a peripheral part in a vertical direction and at an orthogonal part, and the electron beams radiated from the electron gun (26) are incident correctly to the desired fluorescent substances (B), (G), (R) 』(line 16, right upper column to line 4, left lower column in page 3).

In the Evidence A No.7 is described 『In the prior art, a countermeasure against a doming has been proposed by RCA as a variable pitch of the shadow mask by increasing a lateral pitch at a periphery of the screen than a lateral pitch at the central part of the screen of the shadow mask to increase a curvature of the shadow mask at the periphery and also to increase a purity allowance. 』 (line 17, left lower column to line 2, right lower column in page 1)

In the Evidence A No.8 is described 『This invention relates to an improvement of a color cathode ray tube, and more particularly an improvement over a color cathode ray tube having a flat plate-like face plate. ... The color cathode ray tube having the prior art flat plate-like face plate was formed such that, as shown in FIGS.1 and 2, the major part (3) of the shadow mask (2) opposing against the face plate (1) was formed into a flat surface or a protruded surface. 』 (refer to line 18, left lower column to line 11, right lower column in page 1).

3-2. Comparison and Judgment

(a) As to the present invention 1:

Comparing the present invention 1 with each of the inventions described in each of the Evidences A submitted by the opponents Teruo Itoh and Taiko Tohyama shows that the feature of a technical item specifying the present invention 1, i.e. "a color cathode ray tube having a glass bulb in which an outer surface in the effective screen region of the face plate is substantially flat surface and the inner surface has a concave curvature

facing toward the color selecting mask" is already described in the Evidence A No.1 submitted by the opponent Teruo Itoh and the Evidence A No.2 submitted by the opponent Taiko Tohyama and the technical feature specifying the present invention 1, i.e. "a color selecting mask arranged in opposition to the inner surface of the face plate and having a convex curvature larger than a curvature of the inner surface of the face plate facing against the face plate" is already described in the Evidence A Nos. 2, 3 submitted by the opponent Teruo Itoh and the Evidence A Nos. 3 to 5 and 7 submitted by the opponent Taiko Tohyama. However, the technical item specifying the present invention 1, i.e. "a glass bulb satisfying a relation of $T = 1.2T_0$ to $1.3T_0$, where T is a thickness of the peripheral part in a horizontal direction in the effective screen region and T_0 is a thickness of the central part in the effective screen region of the face plate" is not described and is not suggested in any of the Evidences submitted by the opponents Teruo Itoh and Taiko Tohyama. That is, the Evidence A No.1 submitted by the opponent Taiko Tohyama merely has a description saying that "there is provided a relation of $1.0 \leq td/t_0 \leq 1.2$ on the orthogonal line of the face part, where a glass wall thickness at each of the central part of the effective screen part of the face of the glass panel and a location near its end is defined as t_0 and td , respectively." But, each of the other Evidences has no description relating to a numerical value expressing a relation between the thickness T at the peripheral part and the thickness T_0 at the central part of the effective screen region. Then, since it is apparent that the glass thickness at the end part on the orthogonal line is larger than the glass thickness at the peripheral part in a horizontal direction, if the range of numerical value described in the Evidence A No.1 (of the opponent Taiko Tohyama) is converted into the thickness T at the peripheral part in a horizontal direction of the present invention 1, it is apparent that the upper limit value becomes smaller than 1.2 and the aforesaid range of numerical value described in the Evidence A No.1 (submitted by the opponent Taiko Ohyama) is different from the range of numerical value of the present invention 1. Further, in reference to the description in the Evidence A No.1 (submitted by Taiko Tohyama) saying that "a flat formation of the face is required and the screen is made flat with a radius of curvature of about $1.5R$ to $2.0R$ being applied" and also a radius of curvature at the outer surface (640 mm, 1200

mm) in the glass panel indicated in [Table 3], it is not possible to say that the outer surface of the face described in the Evidence A No.1 (submitted by the opponent Taiko Tohyama) is substantially flat surface.

Then, the present invention 1 produces a remarkable effect described in the specification.

Further, also as to the reasons for cancellation noticed by the Examiner, each of the publication Nos. 1, 2, 3 and 4 cited in the reasons is the same as the Evidence A Nos. 1, 2 submitted by the opponent Teruo Itoh, the Evidence A No.3 submitted by the opponent Taiko Tohyama and the Evidence A No.4 submitted by the opponent Teruo Itoh, and the present invention 1 could not be easily invented in reference to each of the Evidences as described above, resulting in that the reasons for cancellation are eliminated.

Accordingly, the present invention 1 could not be easily invented by those skilled in the art in reference to the inventions described in each of the aforesaid Evidences submitted by the opponents Teruo Itoh and Taiko Tohyama.

(b) As to the present invention 2

Since the present invention 2 is further restricted in reference to the present invention 1, the present invention 2 could not be easily invented by those skilled in the art on the basis of the inventions described in each of the aforesaid Evidences submitted by the opponents Teruo Itoh and Taiko Tohyama due to the same reasons as those for the aforesaid present invention 1.

3-3. Conclusion

As described above, it is not possible to cancel the patent in regard to the present inventions 1, 2 in view of the reasons and proofs for the filing of opposition to grant for patent.

Further, it is not possible to discover the reasons for canceling the patent on the present inventions 1, 2.

Thus, it is decided as described in the conclusion.

This day of April 19, 2001

Presiding judge: Trial examiner of the Patent Office

Yoshinori Hirai

Trial examiner of the Patent Office

Hiroyuki Sugino

Trial examiner of the Patent Office

Masao Sakaei

[Classification of decision] P1651.121-YA (H01J)

This is to certify that the foregoing is the same as the items recorded in a file.

Date of certification: April 19, 2001

Clerk of trial: Syoko Nomoto

United States Patent & Trademark Office
Office of Initial Patent Examination

Application papers not suitable for publication

SN 10050537

Mail Date 01/18/02

- Non-English Specification
 - Specification contains drawing(s) _____ or table(s) _____
 - Landscape orientation of text Specification Claims Abstract
 - Handwritten Specification Claims Abstract
 - More than one column Specification Claims Abstract
 - Improper line spacing Specification Claims Abstract
 - Claims not on separate page(s)
 - Abstract not on separate page(s)
 - Improper paper size -- Must be either A4 (21 cm x 29.7 cm) or 8-1/2"x 11"
 - Specification page(s) _____ Abstract
 - Drawing page(s) _____ Claim(s)
 - Improper margins
 - Specification page(s) _____ Abstract
 - Drawing page(s) _____ Claim(s)
 - Not reproducible
- Section
- Reason Specification page(s) _____
 - Paper too thin Drawing page(s) _____
 - Glossy pages Abstract
 - Non-white background Claim(s)
 - Drawing objection(s)
 - Missing lead lines, drawing(s) _____
 - Line quality is too light, drawing(s) _____
 - More than 1 drawing and not numbered correctly
 - Non-English text, drawing(s) _____
 - Excessive text, drawing(s) _____
 - Photographs capable of illustration, drawing(s) _____